Module Synopsis – Diploma in Construction Engineering

Assessment weighting for all modules (Unless Stated):

Coursework assignment 40-60% | Final Examination 40-60%

Advanced Concrete Technology

To provide students with knowledge of the treatment of raw materials in production and construction of high quality concrete for buildings and infrastructure. By the end of module, students will learn to characterize the behaviour of aggregates, cement types and concrete products etc.

Construction Safety

To familiarize students with the safety and health hazards in the construction industry and be able to implement and audit the Safety Management System. It also provides students with knowledge of how to supervise the construction, erection, alteration or dismantling of any formwork structure within a worksite setting.

Quantity Surveying

To provide students with the skills and knowledge to understand the history of Quantity Surveying, the duties and functions of a Quantity Surveyor. Knowledge of the standard method of measurement of building works and knowledge of quantity take-off are also covered.

Building Services

This module covers broad fundamentals of building services design and the function of services in commercial buildings and their importance to the core business in areas of electrical services, lighting, heating, ventilation and air conditioning, lifts and water.

Construction Plant & Equipment

This module introduces students to the operations and understanding of key construction equipment. At the end of this module, students will be able to have the knowledge, skills, and attitudes to enable them to select appropriate construction equipment for specific construction operations that are based on equipment output; quality and quantities of work; economic use of the equipment and the nature of work to be done.

Civil and Construction Engineering Materials

To provide an introductory overview of the various materials used in civil and construction engineering and their fundamental principles of structural, physical and long-term performance. At the end of the course, students able to understand various civil and construction engineering material applications and detailing in structural and non-structural building components. Students will gain a comparative knowledge of material properties and possible applications in construction and architecture.

Construction Technology

To provide students with the knowledge of design principles for larger scale buildings such as office blocks, high rise residential and mixed use buildings, shopping malls, warehouses, factories and the like. The focus is on building systems and materials and it is intended to provide students with a basic knowledge of materials and processes employed in the design and construction of large buildings.

Construction Contract Management

To enable students identify legal principles of elements of contract and how the selection of right contract type may affect project undertakings. Key legal principles and knowledge areas covered will provide understanding of business legal terminologies, select the offer that will result in the best value for the buyer, negotiate favourable terms and make revisions to the contract, and administering the contracts appropriately.

Construction Accounting & Finance

To provide students with sound technical knowledge to understand the preparation of financial accounts. Basic knowledge and understanding of the fundamental principles of accounting and finance will be taught. Students will also be introduced to simple financial budgeting/planning, costing, time value of money, cash flow projection and other relevant concepts.

Earth Systems

This module introduces to the nature of Earth science, its processes and its relationship to other scientific fields. Earth science utilizes a systems approach to the dynamic nature of Earth while at the same time retaining a uniqueness unlike other sciences. The formation of the universe, solar system, and planet are key to understanding of the processes that shape planet Earth. Earth as a sphere and a subset of four interacting spheres also plays a key role in understanding our plant.

Construction Management Systems

To provide students with knowledge of the various forms of project delivery methods (Design-Bid-Build, Design-Build, and Construction Management) and the underlying principles for choosing the appropriate system. Students will learn to recognize the complexity of the pre-construction process including conceptual estimating and scheduling, life cycle costing, constructability reviews, value engineering, risk management and special contract requirements.

Precast Concrete Construction

To provide students with foundation knowledge of covers design aspects of precast connections; bearing and non-load-bearing precast walls; moment resisting frames; precast buildings under lateral loads. Provides student an understanding of the different types of precast systems.

Prestressed Concrete Construction

To provide students with knowledge of the properties of concrete; prestressed concrete beams under flexure, shear, and torsion; time-dependent behaviour; statically indeterminate structures and post-tensioned slab systems. Other key aspects including design of connections; moment resisting frames; buildings under lateral loads will also be covered.

Construction Project Management

To provide students with the knowledge of principles of project management and their applications in construction projects. Techniques in managing construction projects will be taught including project planning, cash flow analysis, Gantt chart, and critical path methods using network diagrams.

Structural Appraisal and Repair

To provide students with the knowledge of concrete deterioration, non-destructive testing techniques and methods of concrete repair. Students will recognise the causes of defects in reinforced concrete.

Technical Drawings & Structural Detailing

Students will learn the basics of technical drawing (sketching/scaling, basic CAD/computer skills, lettering and line work, math as it relates to drawing, architecture, orthographic projection, dimensioning, pictorial drawings, advanced CAD skills, etc.) through a series of projects / assignments.

Assessment weighting: Coursework assignments - 100%

Land Surveying

To provide students with the fundamentals of land surveying techniques, introduction to the principles of construction surveying, project layout, field performance and surveying equipment management. The use and care of surveying instruments, directions, angles, surveying calculations, errors, and computations of areas and volumes will be covered in this module

Structural Analysis

To provide students with an introduction to structural systems and basic analysis methods for beams, frames, and trusses. Topics covered include the analysis of statically determinate and indeterminate structures, deflection calculations, influence lines, and an introduction to the

stiffness method.

Structural Mechanics

To provide student with knowledge of structural forms and their characteristics, including axial and bending action in resisting external forces, develop models and solve straightforward problems in structures, including simple trusses, beams and frames, and determine the internal forces in statically determinate structures, the stresses within simple elements and cross- sections, deflections in simple beams.

Technopreneurship

This course provides an overview of technopreneurial activity, including evaluation and planning of a new business, financing, team building, product development, marketing and operational management issues, intellectual property protection, alternative models for revenue and growth, and exit strategies.

Reinforced Concrete Design

To provide students with an understanding of the structural design process, the mechanics of reinforced concrete, and the ability to design and proportion structural concrete members including slabs, beams, and columns for strength, serviceability, and economy. Design procedures are based on Eurocode 2 standards.

Steel Structure Construction

To enable students to learn the behaviour and design of structural steel components, for example, members and connections in two - dimensional (2D) truss and frame structures. At the end of the course, student will be able to gain a practical and comprehensive experience in the design of simple steel structures using Euro code.

Engineering Mathematics 1

To provide students with the knowledge of limits, continuity, differentiation, applications, definition of the integral, and fundamental theorem of integral calculus.

Engineering Mathematics 2

To provide students with the knowledge to apply integration, differentiation, and integration of transcendental functions and methods of integration, L'Hopital's rule, conic sections, parametric equations, polar coordinates, infinite series.

Transportation Engineering and Design

This course introduces students to methods and underlying principles for the design and control of the elements of road and railway infrastructure. Students also become familiar with transportation system terminology, flow analysis, driver, vehicle and road characteristics, and aspects of road geometrics, road construction, drainage, pavements and maintenance.

Sustainable Engineering Practice

This course introduces students to professional skills that are integral to an engineering workplace. The focus is on integrating professional skills with technical skills. Students will be asked to apply their theoretical learning to engineering-based assessments. The course will also introduce students to sustainability and `Green' engineering concepts.

Industrial Attachment*/Integrated Project

The aim of the industrial attachment is to foster professionalism in student development by placing them in real-world working environment within the context of the industry to develop further their practical skills. This is to bring out the some theoretical underpinnings of the classroom context to a demonstration of their understanding and applications to the dynamic industry. Students are expected to be placed in Construction Engineering traineeship position in establishments in the industry to meet the internship criteria for a period of six months.

* Industrial Attachment (IA)

- Student is entitled to only one Industrial Attachment posting; and
- No further IA posting will be arranged if the student withdraws or is terminated by the IA training partner.